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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,426	01/12/2004	Xuezhong Jiang	06495 USA	2071

23543 7590 02/27/2007

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EXAMINER	
VIJAYAKUMAR, KALLAMBELLA M	
ART UNIT	**PAPER NUMBER**
1751	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/755,426	JIANG ET AL.	
	Examiner	Art Unit	
	Kallambella Vijayakumar	1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/28/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4 and 6-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6-19,22 and 23* is/are rejected.

7)☒ Claim(s) *20 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

- Claims 1-2, 4, 6-23 are currently pending with the application. Claims 1-2, 4, 6, 8-10, 12, 15-21 were amended. New claims 22-23 were added.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The disclosure teaches a particle size less than 450 nm while it is not enabled for less than about 450nm that encompasses particles slightly larger than 450 nm.

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-2, 4, and 6-14 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Soltzing (US 7,071,289).

Soltzing teaches a dispersion of polythieno[3,4-b]thiophene (PTT) in a solvent, spin coating of the dispersion to form uniform thin films, a film with a thickness of about 0.2 micron (200 nm), and devices containing the film (Abstract, C-1, Ln 24-32, C-2, Ln 50 to C-3, Ln 35, C-4, Ln 13-17; C-6, Ln 48-68; C-12, Ln 17-21). The prior art further teaches tailoring the doping and modifying the conductivity of polythieno[3,4-b]thiophene with polymeric sulfonic acids such as polystyrene sulfonic acid (Abstract, Cl-7, Ln 7-31; Cl-9, Ln 16-37).

With regard to the dispersion, the prior art teaches a coating solution containing PTT/PSS and forming a film by spin coating using the solution (Cl-11, Example-2).

Instant claimed particle size of the conducting polymer being less than 450nm and/or 200nm in the claims will be anticipated over the film thickness of about 0.2-micron, because the particles will be inherently smaller than the film thickness (C-12, Ln 17-21) (Further See, Soltzing, US 2005/0124784, Para 0013, 0022). Regarding the electrical conductivity values and properties in the claims, the prior art composition is either same or substantially same as that by the applicants and identical compositions have identical properties. With regard to the product by process limitation in claim 1, the prior art product is substantially same as that produced by the method step of the applicants, and when the reference teaches a product/s that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See In re Marosi, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And In re Thorpe, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Soltzing et al be insufficient to arrive at the limitations of the instant claims by the applicants, it would be obvious to a person of ordinary skill in the art to modify the electrical conductivity of the PTT derivative by doping with dopants to optimize its conductivity to suit the desired application with reasonable expectation of success, because the prior art is suggestive of it (C-6, Ln 58-64; C-7, Ln 13-50, Cl-9, 27-38).

2. Claims 15-19 and 22-23 are rejected under 35 U.S.C. 103(a) as obvious over Soltzing (US 7,071,289).

The disclosure on the PTT/PSS dispersion and film as set forth in rejection-1 under 35 USC 102(e)/103(a) is herein incorporated.

The prior art teaches electroluminescence/electrochromic/photovoltaic device or OLED components containing the doped/undoped PTT films as hole-transport layer/hole-injection layer/light emitting layer/electron transport layer <I-film/layer> (C-7, Ln 37-50).

The prior art is silent about a second polymeric film/layer and the properties of the I-layer film per the claims.

However, the prior art teaches an OLED to typically contain an anode, cathode, a hole-injection layer, a hole-transport layer, an electron injection layer, a charge transport layer and an emission layer <Second Film>, thereby presence of a light emitting layer in the OLED structure will be obvious.

With regard to claims 16-19 and 23, it would have been obvious to a person of ordinary skilled in the art to modify the charge transport properties of PTT layers as choice of design of the layer functionality in an OLED with reasonable expectation of success, because the prior art teaches modifying the PTT by doping and forming admixtures to attain various charge transport and charge injection layers (Cl-7, Ln 43-55). Further PTT layers are semiconducting charge transport materials based on the nature and extent of doping. Regarding the electrical and emission properties in the claims 15 and 22, the prior art composition is similar to that by the applicants and similar compositions are expected to possess similar properties.

3. Claims 1-2, 4 and 6-7 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Soltzing (US 2005/0124784).

Soltzing teaches a dispersion of polythieno[3,4-b]thiophene (PTT) with a particle size less than 200 nm in a solvent, forming a film by spin-coating or LBL technique, and optoelectronic devices containing the film (Abstract, Para 0013, 0017, 0022, 0030, 0054-0056, 0060-0061, 0081 and 0085). Soltzing further teaches modifying properties of the thiophene derivative by substitution, and conductivity by doping with polyanions such as polystyrenesulfonic acid(Para 0016, 0021, 0022, 0025, 0031, 0057). The prior art further teaches the conductivity of PTT film to be about 5.6X10-3 S/cm (Pg-7, Example-2) and to vary it as desired (Para 0021). Regarding the electrical conductivity values and properties in the claims, the prior art composition is either same or substantially same as that by the applicants and identical compositions

have identical properties. With regard to the product by process limitation in claim 1, the prior art product is substantially same as that produced by the method step of the applicants, and when the reference teaches a product/s that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See In re Marosi, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And In re Thorpe, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Soltzing et al be insufficient to arrive at the limitations of the instant claims by the applicants, it would be obvious to a person of ordinary skill in the art to modify the properties of the thiophene derivative by substitution and/or its electrical conductivity by doping with dopants to optimize its properties/conductivity to suit the desired application with reasonable expectation of success.

4. Claims 8-14 are rejected under 35 U.S.C. 103(a) as obvious over Soltzing (US 2005/0124784).

The disclosure on the composition PTT coating solution and the film as set forth in rejection-3 under 35 USC 102(e)/103(a) is herein incorporated. The prior art teaches using PTT/PSS composition in forming films and OLED's containing PTT or PTT/PSS films.

The prior art is silent about a slurry composition containing PTT/PSS per the claims.

With regard to the claims 8-14, the prior art teaches forming the films by coating from a solution and it would have been obvious to have prepared a PTT/PSS coating solution (Para 0054, 0057). With regard to the film properties, the prior art composition is similar to that by the applicants, and similar compositions are expected to possess similar properties. Further PTT layers are semiconducting charge transport materials based on the nature and extent of doping.

5. Claims 15-18 and 22-23 are rejected under 35 U.S.C. 103(a) as obvious over Soltzing (US 2005/0124784).

The disclosure on the composition PTT coating solution and the film as set forth in rejection-3 under 35 USC 102(e)/103(a) is herein incorporated. The prior art teaches using PTT/PSS composition in forming films and OLED's containing PTT or PTT/PSS films.

The prior art is silent about the structure of OLED containing a second polymeric layer and the properties of the I-layer film per the claims.

With regard to claim-15, the prior art teaches an OLED to typically contain an anode, cathode, a hole-injection layer, a hole-transport layer, an electron injection layer, a charge transport layer and an emission layer <Second Film>, thereby presence of a light emitting layer in the OLED structure will be obvious (Para 0061).

With regard to claims 16-18 and 23, it would have been obvious to a person of ordinary skilled in the art to modify the charge transport properties of PTT layers as choice of design of the layer functionality in an OLED with reasonable expectation of success, because the prior art teaches modifying the PTT by doping and forming admixtures to attain various charge transport and charge injection layers (Para 0057, 0058, 0061, 0021, 0026). Regarding the electrical and emission properties in the claims 15 and 22, the prior art composition is similar to that by the applicants and similar compositions are expected to possess similar properties.

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soltzing (US 2005/0124784) in view of Yamamoto et al (US 5,540,999).

The disclosures on the composition of the polythieno[3,4-b]thiophene dispersion, a polythieno[3,4-b]thiophene film and the device containing the film by Soltzing (US-289) as set forth in rejection-1 under 35 USC 102(b)/103(a), and by Soltzing (US-784) as set forth in rejection-2 under 35 USC 102(b)/103(a) are herein incorporated.

The prior arts are silent about the use of the thiophene derivative film as a hole-injection and hole-transport layer. However, it teaches modifying the charge transport properties of the PTT films by doping/admixing, and using them in the components of an electroluminescence/electrochromic/ photovoltaic devices and OLED.

In the analogous art, Yamamoto et al teaches an electroluminescent element containing an organic compound layer of a thiophene polymer as a light emitting layer or a hole-injection-transport layer (Abstract).

It would be obvious to a person of ordinary skilled in the art to combine the prior art teachings to form a hole injection transport layer of an electroluminescent device with the thiophene derivative of Soltzing as functional equivalent of thiophene with reasonable expectation of success, because the combined prior art teaching is suggestive of the claimed layer and device.

7. Claims 8-13 are rejected under 35 U.S.C. 102(b) as anticipated by Jonas et al (US 6,004,483).

Jonas et al teach a coating solution comprising colloidal dispersion with the formula Polythiophene$^{+}An^{-}$, where anions comprise polystyrenesulphonic or polyvinylsulfonic acid polyanions, and colloidal dispersions contain particles not exceeding 100 nm in size (Cl-1, Ln 16-Cl-2, Ln 26; Cl-6, Table).

With regard the properties in claims 8 and 11-13, the prior art composition is either same or substantially same as the instant claimed composition and further, a film produced by the prior art composition will be same or substantially same as that produced from instant claimed composition, and identical compositions have identical properties. All the limitations of the instant claims are met.

The reference is anticipatory.

Allowable Subject Matter

Claims 20-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior art of record neither teaches nor fairly suggest an optoelectronic device containing a I-layer of PTT and a light emitting layer containing the specific components

Response to Arguments

Applicants argue that Soltzing does not disclose a dispersion, film or a device meeting the properties in the instant claims (Response, Pg-6, Para 2-3) is not persuasive, because prior art compositions are either same or substantially same as that by the applicants including particle size, dopants and conductivity, whereby the rectification ratio will be obviously present in the prior art composition. The prior art teaches filtering the solutions through 0.2micron filter containing particles of about or less than 200 nm and forming films with a conductivity of 5.6X10-3 S/cm that is the same range as that disclosed by the applicants.

For the reasons set forth above, instant claimed compositions and the device fail to patentably distinguish over the prior art compositions and device.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KMV
February 16, 2007.

DOUGLAS MCGINTY
SUPERVISORY PATENT EXAMINER
1751